

## **Modeling and Simulation Role in designing a Teleradiology System:**

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### **Abstract:**

In designing complex systems, Engineers, Developers and Systems Architects always have to make quantitative assumptions in order to satisfy anticipated loads and expectations of the final product. Many questions are asked before any complex system design that relate to systems performance, infrastructure and components configuration, behavior prediction and bottlenecks fixes.

All these questions can be answered using modeling and simulation tools that allow engineers to predict systems behaviors in different settings and optimize systems in production by identifying bottlenecks and flaws in the infrastructure or workflow.

### **Purpose:**

The Imaging Science and Information System, Georgetown University Medical Center (ISIS) took on the initiative of deploying Teleradiology capabilities in the Department of Radiology Georgetown University Medical Center.

The purpose of the system is to provide Radiologists access to Medical images from home while on call at night or during weekends, also the system is to be used inside the hospital to allow clinicians from different departments access to medical images.

The system's architecture is very complex and includes different medical imaging modalities, networking components, communication links, security components (firewall, VPN server), clients' and server hardware and software.

To be able to design a predictable system and meet the requirements we used modeling and simulation tools to develop a performance model this approach enabled us to deploy an efficient Teleradiology system and forecast performance after making changes in the workload and systems architecture.

In this poster we will describe the simulation and modeling methods used to design and deploy the system, we will also provide comparison results of system's predicted performance in design mode versus actual production mode.